

## IMPROVED MOTOR VEHICLE SAFETY BARRIER MOUNTING

This invention relates to an improved mounting bracket for attachment to a perimeter frame member of a safety screen or barrier for use in a motor vehicle. The invention concerns safety screens of the type wherein a mesh in-fill panel is secured to a tubular metal peripheral frame and which, when mounted within the vehicle, extends transversely from side to side and from the roof to the floor of the vehicle and against which any unrestrained forwardly moving load can impact in a situation where the vehicle comes to a sudden halt or suddenly decelerates.

Metal mesh safety screens of the aforementioned kind are well known in the industry and have been in common use for many years. It is also known for these screens to be secured in position within the vehicle by means of either fixed metal brackets which are rigidly fixed to both the screen frame and an anchorage plate fixed, for example, in the floor of the vehicle, or by means of a plurality of elongate securing straps which extend rearwardly away from the screen and each of which is attached at its leading end to a fastening bolt which is itself mounted in a rigid mounting plate or lug fixedly secured, eg by welding, to the screen frame. The use of elongate securing straps in order to secure the screen in position is disclosed in our Australian patent specification number 583738 entitled "Vehicle Safety Screen Fixing Means". While the fixing system described in the aforesaid patent has proven generally satisfactory, the requirement to weld an attachment plate or lug to the screen frame member in order to permit attachment of the securing strap, adds to the manufacturing cost of the screen (as well as requiring an additional component part). Furthermore, the securing straps, when the screen is being moved either rearwards to its rear position or from its rear position to its forward position, will normally protrude from the sides of the screen frame and tend to catch on the vehicle interior trim, and may cause damage to the trim.

It would be desirable therefore if the elongate securing straps were able to be attached to the perimeter frame of the safety screen in a manner which avoids any welding and so that the securing straps can be moved to storage positions where they do not laterally protrude from the frame when the screen is being shifted from one position to another.

It is the main object of the present invention therefore to provide an improved form of attachment which will allow the elongate securing strap to be secured to a perimeter frame member of the screen or barrier in a simple and inexpensive manner and which will allow the strap to be readily moved to an out-of-use position to in turn allow the screen to be conveniently shifted from one position to another.

It is another object of the present invention to provide an improved form of attachment for securing an elongate securing strap to a perimeter frame member of a safety screen which is designed to allow the strap to be rotated between out-of-use positions on either side of the mesh in-fill panel of the screen.

It is yet another object of the present invention to provide an improved attachment bracket for attaching an elongate securing strap to a perimeter frame member of a vehicle safety screen, which is separate from and does not need to be rigidly fixed, eg by welding, to the screen frame itself, and no special attachment point is required on the screen frame.

Broadly, according to this invention therefore, there is provided an improved motor vehicle safety screen of the type comprising a metal mesh in-fill panel secured to a tubular metal perimeter frame, a plurality of securing straps for securing the frame to the roof and floor of the vehicle, and attachment means for connecting one end of each said strap to a respective frame member of the perimeter frame, the other end of each said strap being adapted for connection to a respective anchorage in the vehicle

floor or roof, the improvement wherein said attachment means of at least one of the straps includes:

an outer connector bracket rotatable about an axis coinciding with the axis of its associated said frame member and having an approximately C-shaped body portion terminating in a pair of spaced apart outwardly extending flanged ends in face to face relationship, and an inner bush non-rotatably mounted on the associated frame member and having a cylindrical bearing surface, said body portion of the bracket surrounding said bush and engaging said bearing surface, whereby said bracket along with its attached securing strap is able to bodily rotate around its said respective frame member, and

wherein said one end of the or each said securing strap is fastened between the flanged ends of a respective said bracket.

Preferably the end of the securing strap is pivotally mounted between opposed parallel flanges which project radially from the ends of the bracket, by means of a fastening bolt and nut, whereby the strap can rotate relative to its bracket about an axis which extends at right angles to its associated perimeter frame member.

In a preferred form of the invention, the connector bracket can rotate through an angle of at least 200 degrees, thereby allowing the securing strap to be bodily swung to positions on either side of the mesh in-fill panel. With the bracket rotated to a position where the strap lies in front of the mesh panel, the strap can be orientated so as to lie approximately parallel to the plane of the mesh in-fill panel, whereby the strap is able to nest within the recessed area defined by the perimeter frame which facilitates product packaging and transportation.

Preferably the bush has a square or rectangular through bore which is complementary to the shape of the outer profile of the perimeter frame member and frictionally engages therewith, and a cylindrical outer bearing surface for rotatably supporting the circular body portion of the bracket. The bush can be made from EPDM material

having a shore hardness in the range 60 to 65 duro, or from a suitable nylon which has low moisture absorption, high dimensional stability and strength.

In order to more fully describe the present invention, a preferred embodiment thereof is described hereunder in some further detail with reference to and as illustrated in the accompanying drawings wherein:

Figure 1 is a perspective view of a safety screen mounted behind the front passenger seat of a vehicle;

Figure 2 is a fragmentary perspective view of the screen assembly shown in Figure 1, showing one of the upper securing straps in its rearwardly projecting, ready to install position;

Figure 3(a) is a perspective view of a bracket connector shown in its assembled position for attaching the securing strap to the perimeter frame of the safety screen;

Figure 3(b) is a perspective view of the bracket only prior to it being wrapped around its bush attached to its securing strap;

Figure 4 is a fragmentary perspective view of the assembly shown in Figure 1, with the upper securing strap rotated to a position where it lies inboard of the screen perimeter frame, so that the screen can be shifted from one position to another;

Figure 5 is a fragmentary perspective view of the screen assembly shown in Figure 1, wherein the upper securing strap has been rotated to a collapsed packaging position wherein it lies in front of the mesh in-fill panel of the screen adjacent its associated frame member;

Figures 6(a) and (b) are perspective views of the screen assembly shown in Figure 1 respectively showing one of the bottom securing straps in its rearwardly extending in-use position, and a packaging or transporting position wherein it has been rotated so as to lie in front of the mesh in-fill panel and approximately parallel therewith; while

Figures 7(a) – (d) are views showing the internal bush which fits onto the screen frame and around which the bracket 20 is rotatably mounted.

In this embodiment, there is shown a two position safety screen assembly 10 arranged for securement in either a forward position immediately behind the front passenger seat of the vehicle or a rear position where it is mounted immediately behind the folded down rear passenger seat of the vehicle. The screen assembly 10 comprises a screen or barrier 11 having a perimeter frame 12 of tubular metal, and an in-fill panel 13 of heavy wire mesh which fills the closed area defined by the perimeter frame 12. The mesh in-fill panel 13 is normally welded to the rear surfaces of the tubular frame members of the perimeter frame 12.

The screen can be either essentially planar or formed with a slightly arched configuration – in accordance with known art.

As is also known, in both the front and rear mounted positions, the screen 11 is secured in position at four anchorage points, there being two upper fixing points in the cant-rails of the vehicle roof (or in the vicinity thereof) and also two lower fixing points laterally spaced apart in the floor of the vehicle.

The screen 11 is provided with a pair of upper metal securing straps 15 which, in both the front and rear mounting positions of the screen, are releasably secured at their trailing ends by means of quick release connectors 16 to respective anchorage plates (not shown) fixed in the roof panel of the vehicle.

The screen is also provided with a pair of lower short metal securing straps 17 which are removably secured at their trailing ends by means of securing bolts to anchorage plates in the floor of the vehicle. In this embodiment the upper straps 15 are used to secure the upper corner regions of the screen 11 to the vehicle roof, while the lower strap 17 are used to secure the lower corner regions of the screen 11 to the vehicle floor.

The forward end of each of the upper and lower securing straps, 15, 17 is pivotally attached to a bushed pivotal connector 19 which is mounted on a respective frame member 18, 18' of the perimeter frame 12, whereby the connector 19 and also the strap 15, 17 attached thereto can be selectively positioned in any one of a number of different angular positions relative to the screen frame 12.

Each connector 19 has a saddle bracket 20 formed of sheet metal and which comprises a C-shaped body portion 21 which is rotatably mounted on an inner axially split bush 22, the ends of the C-shape body portion 21 of the bracket 20 terminating in outwardly projecting spaced apart flanges 23, between which is clamped the leading end of the strap 15, 17 by means of a pivot pin or bolt 24 and an associated clamping nut 25. The bush 22 has an outer cylindrical bearing surface which is engaged by the inner cylindrical surface of the body portion 21 of the bracket 20, and a square or rectangular through passage 27 shaped to complement the perimeter shape of the frame member 18, 18' of the screen frame 12. The bush 22 is designed to form a tight friction fit with the screen frame member and is made from a rigid plastics material, which in this embodiment, is Nylon 612 Zytel 158L.

Figure 3(b) shows the metal bracket 20 in its pre-assembled condition, with its flanged ends 23 diverging outwardly to facilitate the fitment of the bracket around the bush 22.

With reference to Figure 2 of the drawings, this shows one of the upper securing straps 15 rotated to an outwardly laterally projecting in use position where it extends rearwardly away from the screen frame. In this position, the trailing end of the strap 15 is secured by simply engaging the quick release connector 16 to its respective anchorage point.

Referring to Figure 4 of the drawings, this shows one of the upper straps 15 swung inwardly to an inboard position where it lies almost directly behind the mesh in-fill panel 13. In this position, the screen 11 can be readily moved from one position to its other position within the vehicle without the worry of the upper straps 15 catching on the trim of the vehicle interior.

Referring to Figure 5 of the drawings, this shows the attachment bracket 20 rotated to a position where the upper securing strap 15 lies almost directly in front of the mesh in-fill panel 13, with the flanges 23 of the bracket 20 and also the strap 15 lying within the recessed area defined by the perimeter frame 12. The securing strap 15 is also rotated about its pivot bolt 24 to a collapsed or retracted position wherein it lies alongside its associated perimeter frame member, approximately parallel therewith. This facilitates packaging of the screen assembly 10.

Referring to Figures 6(a) and (b) of the drawings, these show one of the lower securing straps 17 in its rearwardly extending in use position wherein it projects rearwardly of the mesh in-fill panel 13 and a forwardly rotated retracted packaging position wherein it projects upwardly in front of the mesh in-fill panel 13 and lies within the area defined by the perimeter frame 12 of the screen 11.

The bushed bracket connectors 19 are fitted to their frame members 18, 18' at spaced locations therearound by firstly attaching the split bush 22 onto the frame member so that its bore grips the outer perimeter surfaces of the frame member. Thereafter the divergent flanged ends 23 of the saddle bracket 20 are located on opposite sides of

the bush 22 and the bracket 20 laterally pushed across the bush 22 so that the body portion 21 is wrapped therearound with the ends 23 projecting radially outwards.

Finally, the spread apart flanged ends 23 are squeezed together, eg by means of clamping tool, to thereby deform same so that they lie approximately parallel and in face to face relationship. The leading end of the strap 15, 17 can then be inserted between the flanged ends 23 of the bracket 20 and clamped by the securing bolt 24 which passes through aligned holes 26 in the flanged ends 23 and the leading end of the strap.

Referring to Figures 7(a) - (d), the bush 22 is moulded as two halves 28, 29 which are hinged together at 30, with the halves 28, 29 having co-operable catch or clip formations 31, 32 extending axially along their non-hinged sides and which are designed to clip together when the halves 28, 29 are wrapped around the frame members 18, 18' of the screen 11. When so clipped, the bush 22 is firmly frictionally retained in position on the frame, and facilitates the engagement of its saddle bracket 20 therearound.

The bush 22 has end perimeter flanges 33 which assist the location of the body portion 21 of the bracket 20 and prevent any relative axial displacement therebetween. The outer cylindrical surfaces of the bush 22 are desirably smooth and hard to allow the bracket 20 to readily rotate therearound.

To improve the grip of the bush 22 against the frame member, the internal walls of the halves 28, 29 are formed with protrusions 35.

It will of course be appreciated that the invention is not necessarily limited to all of the features of the abovedescribed embodiment and that variations can be made without departing from the true spirit and scope of this invention. For example, the



pair of bottom straps may be relatively long with their brackets pivotally mounted on the side frame members of the frame 12 adjacent the lower ends thereof.

A brief consideration of the above described embodiment will indicate that the invention provides a vastly improved attachment means for attaching the securing straps to the perimeter frame of a vehicle safety screen, which avoids the need for the bracket attachments to be welded to the screen frame, and which allows the upper securing straps to be swung from their laterally projecting in-use positions to positions in-board of the perimeter frame to thereby facilitate the task of relocating the screen from one position to another without damaging the vehicle interior trim.